

GEOGRAPHIC DISTRIBUTION OF WINGED MAPLELEAF
MUSSEL (*QUADRULA FRAGOSA* (CONRAD, 1835)) IN
THE ST. CROIX RIVER, MINNESOTA AND WISCONSIN.
MWBC 2601400



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Introduction

The winged mapleleaf (*Quadrula fragosa* [Conrad, 1835]) freshwater mussel was listed as federally endangered effective 22 July 1991 (U. S. Fish and Wildlife Service, 1991). A federal recovery plan was completed in 1997 (U. S. Fish and Wildlife Service, 1997) which called for a refinement of the geographic range of this species in the St. Croix River bordering Minnesota and Wisconsin. At the time of the recovery plan's completion, the St. Croix River contained the only known reproducing population of this very rare freshwater mussel.

During 2001, the Wisconsin Department of Natural Resources surveyed a portion of the St. Croix River to refine the distribution of this freshwater mussel. Between the years 1978 and 2001, reliable recent records of living individuals extended from river kilometer (RKM) 74.0 to 84.9 although recently dead ones have been found as far upstream as RKM 86.7. This is a presumed recent geographic range of 12.7 RKM.

Historic geographic range based on pre-1978 records and recent subfossil collections included RKM 29.2-102.8, a total of 73.6 RKM (U. S. Fish and Wildlife Service, 1997; University of Wisconsin Zoological Museum collections; Hove, 2000 Pers. Comm.). Using these numbers, there has been an 83% range reduction in the St. Croix River during the 20th century.

Methods

This survey was conducted from RKM 76.6 to 48.8 during September 2001. We boated this 27.8 km reach searching for locations that would contain microhabitat conditions suitable for winged mapleleaf. These conditions included relatively fast current over a gravel and sand substrate.

Mussel samples were taken only at locations that looked suitable upon preliminary examination. Mussels were collected using SCUBA and the divers were instructed to collect all living and dead. Sampling effort at each location dove depended upon the population density and community. Locations with high population density and a relatively high proportion of associates were dove longer.

Results

A total of 11 mussel aggregations were examined (Figure A). Aggregations were located adjacent to land with higher elevations than locations where aggregations were absent. Of these 11, 10 were dove at a total of 18 locations. We found two dead (empty) winged mapleleaf at two locations (RKM 76.3, 73.6) and a single living specimen at RKM 64.7 (Figure A). Of the 10 aggregations sampled, only three contained optimal microhabitat for winged mapleleaf. These three locations were at RKM 76.6, 67.3 and 64.7.

A total of 1063 living and 1808 dead mussels were collected at all locations (Table 1). A total of 27 taxa were found living and additional 5 found as dead individuals only. Winged mapleleaf comprised 0.094% of the fauna. No living *Lampsilis higginsii*, another federally endangered mussel was found although one dead was found at RKM 71.8.

Discussion

Based on our work during this and other studies on the St. Croix River, suitable habitat conditions for *Q. fragosa* are quite limited on the reach surveyed during 2001 compared to upstream reaches in the center of this species geographic range. Only three relatively small locations were found that appeared adequate compared with those upstream. Upstream of the 2001 study reach, which includes 10.9 RKM, there is approximately 271,700m² of documented adequate habitat. In the 2001 study reach, which includes 27.8 RKM, there is approximately 33,000m² of adequate habitat. In other words, the 2001 study reach contains only 12% of adequate *Q. fragosa* habitat that the upstream reach contains.

From 1978 to just prior to this investigation, the known geographic range of this species was from RKM 74.0 to about 86.7. During this investigation, we found one living individual at RKM 64.7 extending the known recent range 9.3 RKM or 73%. A graphical summary of winged mapleleaf distribution in the St. Croix River is given in Figure B. The known historic geographic range is from RKM 29.2-102.8, or from the vicinity of the Nevers Dam site downstream to Hudson, Wisconsin. The presumed historic range extends farther downstream to the confluence with the Mississippi River at Prescott, Wisconsin since this is the presumed post-glacial colonization route and since *Q. fragosa* once lived in the lacustrine-like microhabitat of Lake St. Croix. One could also presume that the recent range extends downstream to RKM 59.5 near Marine on St. Croix, Minnesota since one very freshly dead specimen was found here during 2000 during routine monitoring (Heath et. Al, 2001).

Therefore, it seems likely that *Q. fragosa* once inhabited at least from RKM 0-102.8. Its post-1978 range extends from RKM 59.5 to 86.7 or 27.2 RKM. This is a 74% reduction in geographic range since about 1900. Within the remaining 27.2 RKM of range, about one-third of this, or 9 RKM, contains nearly all of the population and suitable microhabitat.

Figure A. Location of 11 Mussel Aggregations
and 18 Locations Sampled during 2001 by the WDNR.

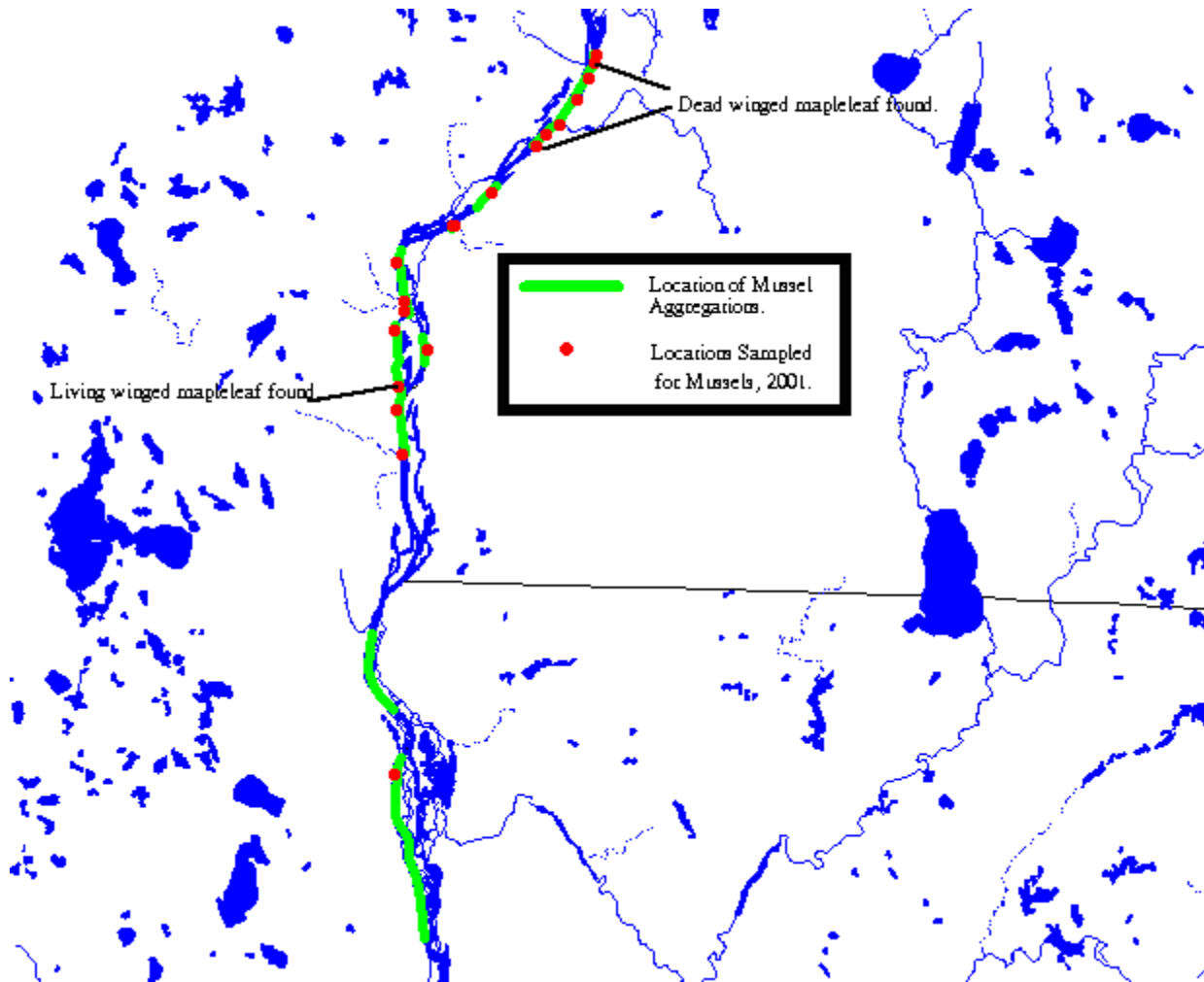


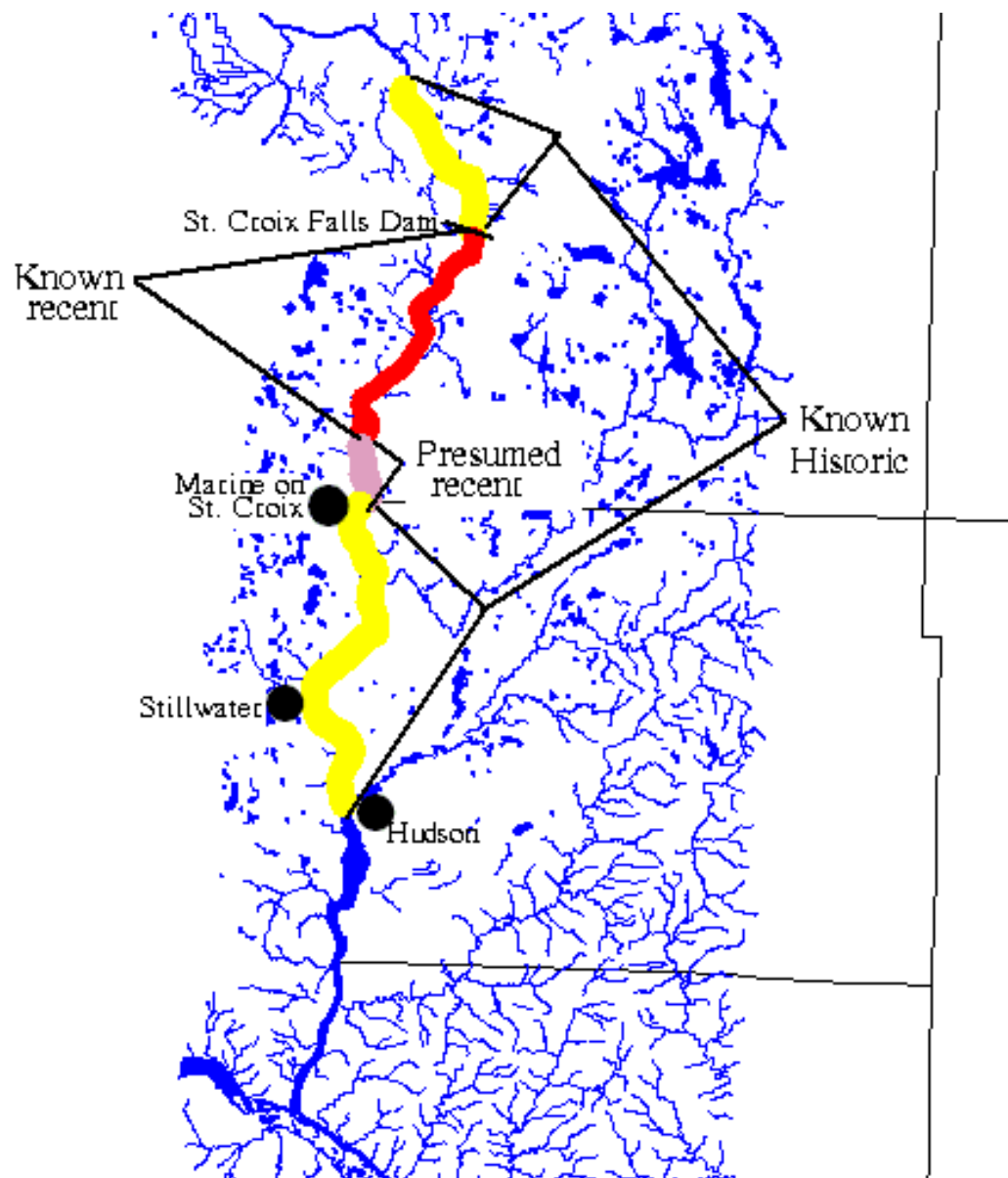
TABLE 1. Number Living and Dead Collected from the St. Croix River, 2001.

	TAXON	#LIVE	#DEAD
1	<i>Actinonaias ligamentina carinata</i>	105	121
2	<i>Alasmodonta marginata</i>	5	5
3	<i>Amblema plicata plicata</i>	57	55
4	<i>Anodonta grandis form corpulenta</i>	2	5
5	<i>Cumberlandia monodonta</i>	1	1
6	<i>Cyclonaias tuberculata</i>	5	11
7	<i>Ellipsaria lineolata</i>	3	4
8	<i>Elliptio crassidens crassidens</i>	0	1
9	<i>Elliptio dilatata</i>	71	116
10	<i>Epioblasma triquetra</i>	14	23
11	<i>Fusconaia ebena</i>	0	2
12	<i>Fusconaia flava</i>	97	600
13	<i>Lampsilis higginsii</i>	0	1
14	<i>Lampsilis siliquoidea</i>	5	13
15	<i>Lampsilis cardium</i>	29	32
16	<i>Lasmigona complanata complanata</i>	10	3
17	<i>Lasmigona costata</i>	3	9
18	<i>Leptodea fragilis</i>	41	51

19	<i>Ligumia recta</i>	7	20
20	<i>Obliquaria reflexa</i>	15	21
21	<i>Obovaria olivaria</i>	6	8
22	<i>Pleurobema sintoxia</i>	23	40
23	<i>Potamilus alatus</i>	51	50
24	<i>Quadrula fragosa</i>	1	2
25	<i>Quadrula metanevra</i>	162	59
26	<i>Quadrula pustulosa pustulosa</i>	38	88
27	<i>Strophitus undulatus undulatus</i>	17	19
28	<i>Toxolasma parvus</i>	0	1
29	<i>Tritogonia verrucosa</i>	109	85
30	<i>Truncilla donaciformis</i>	0	3
31	<i>Truncilla truncata</i>	185	358
32	<i>Corbucula fluminea</i>	1	1

		1063	1808

Figure B. Historic and Recent Distribution of *O. fragosa* in the St. Croix River, Wisconsin & Minnesota. 2001



REFERENCES USED

Heath, David J., Ronald Benjamin and Mark Endris. 2001. Results of 2000 Monitoring of Freshwater Mussel Communities of the Saint Croix National Scenic Riverway, Minnesota and Wisconsin. 13 pp.

U. S. Fish and Wildlife Service. 1991. Federal Register. 50 CFR Part 17: Endangered and Threatened Wildlife and Plants; Deter. of Endangered Status for the Winged Mapleleaf freshwater mussel. Federal Register 56(119): 28345-28349. (J. L. Eldridge).

U. S. Fish and Wildlife Service. 1997. Winged mapleleaf mussel (*Quadrula fragosa*) recovery plan. Ft. Snelling, Minnesota. 69 pp + Appen.

Appendix

SCOPE OF WORK

REFINED GEOGRAPHIC DSITRIBUTION OF WINGED MAPLELEAF MUSSEL

**REFINED GEOGRAPHIC DISTRIBUTION OF WINGED MAPLELEAF MUSSEL
(*Quadrula fragosa*) IN ST. CROIX RIVER**

Scope of Work/To be Delivered

This project will refine/more definitively document the downstream limit of the range of winged mapleleaf mussel in the St. Croix River and its locations and abundance to its upstream limit, the hydro generating dam at St. Croix Falls, Wisconsin. The project will also gather and record abundance and distribution information on Higgins' eye pearly mussel (*Lampsilis higgins*).

Specifically, the project will deliver the following:

- a. Map locations of St. Croix River areas surveyed.
- b. Summarized mussel community characterization at each survey area.
- c. Detailed location information for each winged mapleleaf and Higgins' eye mussel found in the survey areas.
- d. Description of the mussel habitat at each survey area.
- e. Legible copies of field data sheets for each survey area.
- f. Data for each winged mapleleaf and Higgins' eye mussel, *i.e.*, age, sex, reproductive condition, shell length, shell height, and tag/identification number.

Delivery Due Date: December 31, 2001

Project Authority/Responsible Party

Wisconsin Department of Natural Resources (WI DNR)

Principal Investigator: David Heath, Endangered Species Specialist, WI DNR

Principal Project Personnel: Ronald Benjamin, Fisheries Supervisor, WI DNR
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